

WE CLAIM:

1. A device for detecting a target molecule in a sample solution comprising:
magnetic beads having in contact therewith polynucleotides capable of participating in
5 an anchored strand displacement amplification reaction; a flow cell having channels for
receiving a flowable medium, said flow cell further having at least one micro sensor
comprising sensor pads and electrodes associated with each sensor pad.

2. A device according to claim 1 wherein said polynucleotides on each bead
comprise a population of polynucleotides, said population further comprising both
10 cleavable and noncleavable single stranded polynucleotides, wherein said cleavable and
noncleavable quality is determined with respect to nicking of said polynucleotides in said
strand displacement amplification reaction.

3. A device according to claim 2 wherein said population of said single stranded
polynucleotides comprises nucleic acid sequences that are capable of hybridizing to 5' or
15 3' sequence of a target nucleic acid.

4. A device according to claim 2 wherein said sensor comprises between 64 and
4096 individual sensor pads.

5. A device for detecting a target molecule in a sample solution comprising:
magnetic beads having in contact therewith polynucleotide probes capable of
20 hybridizing to a target nucleic acid sequence; a flow cell having channels for receiving a
flowable medium, said flow cell further having at least one micro sensor comprising
sensor pads, said pads further having in contact therewith polynucleotide probes capable
of participating in an anchored strand displacement amplification reaction.

6. A device according to claim 5 wherein said polynucleotides on each sensor
25 comprise a population of polynucleotides, said population further comprising both
cleavable and noncleavable single stranded polynucleotides, wherein said cleavable and
noncleavable quality is determined with respect to nicking of said polynucleotides in said
strand displacement amplification reaction.

7. A device according to claim 6 wherein said population of said single stranded
30 polynucleotides comprises nucleic acid sequences that are capable of hybridizing to 5' or
3' sequence of a target nucleic acid.

8. A device according to claim 6 wherein said sensor comprises between 64 and 4096 individual sensor pads.

9. A method for detecting target molecules comprising:

5 a. mixing microbeads of claim 1 or 5 with a sample solution containing at least one target nucleic acid of interest;

 b. contacting said target nucleic acid to either said microbeads or said sensor pads;

 c. performing a strand displacement reaction on said target nucleic acid sequence;

10 d. contacting said microbeads following said reaction of (c) with a microsensor;

 e. binding said microbeads to said sensor; and

 f. detecting the presence of said microbeads bound to said sensor.